

30% DESIGN CONSTRUCTION SPECIFICATIONS

SUBCONTRACT NO. TBD

PROJECT FILE NO. 020996

STAGING, STORAGE, SIZING AND TREATMENT FACILITY (SSSTF)

**FOR INFORMATION ONLY
NOT FOR REVIEW**

DRAFT

Prepared for:
U.S. Department of Energy
Idaho Operations Office
Idaho Falls, Idaho

INEEL

Idaho National Engineering & Environmental Laboratory

BECHTEL BWXT IDAHO, LLC

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**SPECIFICATIONS
FOR
STAGING, STORAGE, SIZING AND TREATMENT FACILITY (SSSTF)**

Prepared for:

**U.S. DEPARTMENT OF ENERGY
IDAHO OPERATIONS OFFICE**

Idaho Falls, Idaho

**SubContract No.
Project File No. 020996**

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**BBWI
Idaho Falls, Idaho 83415**

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PART 1--GENERAL

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1 data shall be submitted to the Contractor in such detail to clearly illustrate that the item,
2 including components and fabrication thereof, or that adjustment of features to make the item
3 "equal", meets requirements of the subcontract drawings and specifications. The
4 Subcontractor shall submit data for "equal" approval and obtain the Contractor's approval
5 before committing to purchase the proposed "equal" item.
6

7 Manufacturers' Operation and Maintenance Manuals: The Subcontractor shall furnish copies
8 of installation, operating and maintenance manuals, for operating equipment and systems, as
9 required by the Vendor Data Schedule. Manuals shall be prepared by the manufacturers of
10 the operating equipment or systems furnished and installed under these specifications.
11

12 Manuals shall be complete and shall include instructions and sufficient data for lubricating,
13 start-up sequence, operating instructions, special test procedures or instructions
14 recommended by the manufacturer, maintenance procedures, a complete parts list and
15 recommended list of spare parts for normal expected maintenance. Wiring diagrams shall be
16 furnished for electrically operated equipment.
17

18 The required number of manuals shall be furnished to the Contractor within 30 calendar days
19 after final shop drawings or vendor data approval has been obtained by the Subcontractor.
20

21 Hazardous Chemicals and Substances: Subcontractor shall submit a list of hazardous
22 chemicals and substances in accordance with General Conditions Article 13 for mandatory
23 approval. Chemicals and substances not previously approved for use will require the
24 submittal of MSDS for mandatory approval.
25

26 See Section 01300, Submittals and the Vendor Data Schedule for additional submittal
27 requirements.
28

29 QUALITY ASSURANCE:

30

31 Quality Assurance Program requirements shall exist to assure that work performed is in
32 conformance with the requirements established by the drawings and this specification. QA
33 Program criteria applicable to this scope of work is addressed in SC-10 of the Special
34 Conditions and these specifications.
35

36 Standard Products: The materials and equipment furnished by the Subcontractor shall be
37 standard products of manufacturers regularly engaged in the production of the type of
38 materials and equipment required and shall be of the manufacturer's latest standard designs.
39 Where two or more units of the same type and class of material or equipment are required,
40 the units shall be the product of the same manufacturer, and shall be identical insofar as
41 possible. The component parts of a unit of equipment need not be the products of the
42 manufacturer.
43

44 Repair of Damages:
45

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1 General: Construction materials and equipment, flange facings, threads, machined or
2 painted, and other exposed finished surfaces shall be protected from damage at all times
3 during shipping, handling, construction and installation. Materials and equipment repaired or
4 replaced by the Subcontractor shall be subject to acceptance by the Contractor.

5
6 **SAFETY, HEALTH AND ENVIRONMENT:**

7
8 In general work shall be in compliance with the applicable sections of 29 CFR 1910, 29 CFR
9 1926 and the BBWI Construction Management Environmental, Health, and Safety
10 Requirements.

11
12 **DELIVERY STORAGE AND HANDLING**

13
14 All materials normally packaged shall be delivered to the site in the original, unopened
15 packages with labels intact. Upon arrival, the Subcontractor shall inspect the materials or
16 equipment for damage.

17
18 Materials and equipment shall be stored and handled in accordance with the manufacturer's
19 instructions.

20
21 **PART 2--PRODUCTS**

22
23 **MATERIALS:**

24
25 New Materials and Equipment: Materials and equipment received by the Subcontractor in a
26 damaged condition shall be repaired or replaced by the Subcontractor as directed by the
27 Contractor. Materials and equipment damaged by the Subcontractor shall be repaired or
28 replaced by the Subcontractor.

29
30 Existing Materials, Equipment and Structures: Existing materials, equipment and structures,
31 including paint and protective coatings, involved under this Subcontract shall be thoroughly
32 inspected by the Subcontractor before starting any work. Any defects or damages, the repair
33 of which are not covered under these specifications or subcontract drawings, shall be reported
34 in writing to the Contractor by the Subcontractor. The Subcontractor shall place reinstalled
35 operating equipment in an operating condition that is at least as good as it was at the time the
36 Subcontractor started work.

37
38 Government Furnished Materials (GFE): Items shown on the subcontract documents as
39 (GFE) are materials and/or equipment that is furnished by the Government to be installed by
40 the Subcontractor. A complete and composite list of such material is attached to the
41 Subcontract Specifications and is referred to as the Schedule "X" list.

42
43 Hazardous Chemicals and Substances: The Subcontractor shall comply with applicable
44 requirements of 29 CFR 1926.59, Hazard Communication Standard.
45

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PART 3--CONSTRUCTION AND INSTALLATION

General: Materials and equipment shall be erected or installed only by qualified personnel who are regularly engaged in the trades required to complete the work. The subcontract drawings show the general arrangement and space allocation of the equipment specified. It shall be the Subcontractor's responsibility to verify changes in conditions or rearrangements necessary because of substitutions for specified materials or equipment. Where rearrangements are necessary the Subcontractor shall, before construction or installation, prepare and submit drawings of the proposed rearrangement for approval.

Coordination of Work: Where new work and existing facilities are shown on the drawings, but are not located precisely by dimensions, the Subcontractor shall be responsible for proper location and clearances and for correcting discrepancies and interferences in the work which are a result of his operations. Work done by one trade that must be integrated with work of other trades shall be laid out with due regard to the work done, or to be done, by other trades; particularly if the work done by one trade depends upon completion or proper installation of work done by other trades. The Subcontractor shall cooperate in coordinating his work with work being done by others if their work must be integrated with the Subcontractor's work. The Subcontractor shall notify the Contractor at least one week prior to starting of the date on which the Subcontractor proposes to proceed with the work.

Workmanship: Work shall be done in a skillful and workmanlike manner. The Subcontractor shall do structural cutting, fitting, patching, repairing and associated work necessary for installation of equipment, piping and electrical conduits, etc. No major cuts or holes, not shown on the drawings, shall be made without prior approval of the Contractor. After the equipment and/or piping is installed, exposed holes, cracks and other defects shall be neatly patched and the patched areas shall match the adjoining materials and finish.

END OF SECTION 01005

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1 **SECTION 01051--CONSTRUCTION SURVEYING AND STAKING**

2
3 **PART 1--GENERAL**

4
5 **SUMMARY:**

6
7 **Section Includes:** Work includes, but is not limited to:

8
9 Establish vertical control, slope staking, and set grade-finishing stakes.

10
11 **SUBMITTALS:**

12
13 Submittals include but are not limited to the following:

14
15 **Certification:** Submit certification that the land surveyor is a registered professional.

16
17 See Section 01300, Submittals and Vendor Data Schedule for additional requirements.

18
19 **QUALITY CONTROL:**

20
21 **Qualifications:** Construction surveying and staking shall be accomplished under the direction
22 of a registered professional land surveyor.

23
24 **PART 2--PRODUCTS**

25
26 **Stakes:** Identification stakes and hubs shall be of sufficient length, width and depth to
27 provide a solid set in the ground and to provide space for marking above ground when
28 applicable. The top 2-in. of all slope, guard, reference, clearing, and structure stakes shall be
29 painted or marked with plastic flagging.

30
31 **PART 3--EXECUTION**

32
33 **SURVEY REQUIREMENT:**

34
35 **Precision:** Precision and accuracy requirements are contained in Table 1. The following
36 precisions shall be used:

37
38 Slope Staking Precision B
39 Finish Staking, Subbase Course - Precision B
40 Finish Staking, Base Course - Precision A

41
42 **Control:** Existing control monuments are shown on the drawings.

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Slope Stakes, Clearing Limits and Reference Stakes: Slope catch-points, clearing limits, and slope reference stakes shall be established. The position of these stakes shall be determined by methods that will produce on the ground the precisions shown in the Table 1.

Clearing limits shall be set within the tolerance shown in the Table 1. The clearing limit shall be located on the ground and marked with lath, flagging, or other methods approved by the Contractor's Representative.

The elevation and location of slope reference stakes shall be verified for accuracy by a differential level run over the reference stakes between benchmarks.

Monuments of Property Boundaries or Surveys of Other Agencies: If property boundary or survey monuments, or survey markers of other agencies, are found within or adjacent to the construction limits, the Subcontractor shall immediately notify the Contractor's Representative. These monuments shall not be disturbed.

Grade Finishing Stakes: Finishing stakes are required on the subbase and the crushed base course. Stakes shall be set on a 50-ft grid and at the shoulders. Subgrade finishing stakes shall be red tops and base course finishing stakes shall be blue tops.

Finishing stakes shall be set when subbase is within 0.2 ft, or base course is within 0.1 ft of final grade. The stakes shall be set to the nearest 0.01 ft of the measured grade line.

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TABLE 1. CROSS SECTION AND SLOPE-STAKE PRECISION

Item	Precision		
	A	B	C
Allowable deviation of cross section line projection from a true perpendicular to tangents, a true dissector of angle points, or a true radius of curves.	$\pm 2_{-}$	$\pm 3_{-}$	$\pm 3_{-}$
Cross section topography measurements shall be taken so that variations in ground from a straight line connecting the cross section points will not exceed:	0.5 ft	1.0 ft	2.0 ft
Horizontal and vertical accuracy for cross-sections. In feet or percentage of horizontal distance measured from transverse line, whichever is greater.	.05 ft or 0.2%	0.15 ft or 0.6%	0.2 ft or 1.0%
Horizontal and vertical accuracy for slope stake, slope stake references, and clearing limits. In feet or percentage of horizontal distance measured from centerline or reference stake, whichever is greater.			
a. Slope reference stakes and slope stakes.			
b. Clearing limits.	0.1 ft or 0.4%	0.15 ft or 0.6%	0.2 ft or 1.0%
	1.0 ft	1.0 ft	1.0 ft

FIELD QUALITY CONTROL:

Surveillance will be performed by the Contractor's Representative to verify compliance of the work to the drawings and specifications.

END OF SECTION 01051

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1 SECTION 01300--SUBMITTALS

2
3 PART 1--GENERAL

4
5 SUMMARY:

6
7 This section specifies the administrative, technical and quality requirements for Vendor Data
8 submittals. Vendor Data requirements are identified in individual specification sections and
9 tabularized on a Vendor Data Schedule. In the event of conflicting requirements, the
10 submittal requirements prescribed in the individual specification section shall prevail.

11
12 The Subcontractor shall submit data, drawings, and other submittals specified. If the
13 Contractor determines the Subcontractor's submittal to be incomplete or unacceptable, the
14 Subcontractor shall make a complete and acceptable submittal to the Contractor by the
15 second submission of a submittal item.

16
17 The Subcontractor shall be responsible for advising the Contractor of any submittal that may
18 be delayed and which might, if further delayed, extend completion of the project.

19
20 Section Includes: Work includes, but is not limited to: The preparation, transmittal and
21 delivery of documents by the Subcontractor to the Contractor as required in the "Submittals"
22 subdivision of the specification section and as provided on the Vendor Data Schedule.

23
24 Related Sections: General Provisions, Special Conditions, Drawings and Vendor Data
25 Schedule and other sections of these specifications apply to this section.

26
27 REFERENCES:

28
29 The following documents, including others referenced therein, form part of this Section to the
30 extent designated herein.

31
32 AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

33
34 ANSI Y14.1 Drawing Sheet Size and Format

35
36 SUBMITTALS:

37
38 General Procedures:

39
40 Vendor data, whether prepared by the Subcontractor or Subcontractor's subtier or supplier,
41 shall be submitted as instruments of the Subcontractor. Therefore, prior to submittal, the
42 subcontractor shall ascertain that material and equipment covered by the submittal and the
43 contents of the submittal itself, meet all the requirements of the subcontract specifications,
44 drawings, or other contract documents.

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Each submittal shall contain identification for each separable and separate piece of material or equipment, and literature with respect to the information provided in the specification and on the Vendor Data Schedule. Submittals shall be numbered consecutively for each different submittal.

Vendor Data Schedule:

Vendor Data required by the specification sections to support construction and operation of the project is identified on a Vendor Data Schedule. The Vendor Data schedule is an attachment to the Specification. The Vendor Data Schedule provides a tabular listing by item number, drawing or specification reference, and description of the item or service. The type of submittal is identified by a vendor data code, which is preceded by the number of copies to be included with the submittal. Routine submittals will require 6 copies for Mandatory Approval and 4 copies for Information Only. The time required to submit the item is identified by a "When to Submit" code. An "Approval" code specifies whether the submittal is for Mandatory Approval or for Information Only. A column is included to indicate if receiving inspection is required.

Or Equal Material or Equipment Submittals:

All "or equal" materials, equipment or systems shall be identified and submitted for approval as required by the General Provisions.

An "or equal" submittal shall contain as a minimum all operating and physical parameters necessary to show that the material or equipment is equivalent to the specified material or equipment. All parameters shall be specifically identified by the submitter in the proposal. Exceptions or differences between the specified item and the "or equal" item shall also be identified.

If an "or equal" material, equipment or system is approved, the Subcontractor shall be responsible backup material necessary to include the material, equipment or system in the technical documents. In most cases this includes "red lining" a set of design drawings, and specifications to provide an "Approved for Construction" set of specifications and design drawings which incorporate the changes caused by the "or equal" item. These "red line" drawings shall be submitted prior to use of the "or equal" item. Any calculations or other backup material necessary to show that changes are adequate shall be included with the "red line" drawings and specifications.

Construction Vendor Data Transmittal and Disposition Form:

All vendor data shall be submitted to the Contractor using the Construction Vendor Data. Transmittal and Disposition Form. The form provides the Subcontractor a convenient method to submit vendor data and provides the Contractor a means of dispositioning the submittal. The Subcontractor shall list the Vendor Data Schedule item number, drawing or

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Disposition by the Contractor

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1 PART 2--PRODUCTS (SUBMITTAL REQUIREMENTS)

2
3 CERTIFIED MILL TEST REPORTS:

4
5 Where specifically required by other sections, certified mill test reports (CMTRs) shall be
6 provided. The CMTRs shall be issued from the manufacturer who actively produces the
7 item(s) and/or material to which the CMTR applies or a certified test laboratory. Each
8 CMTR shall include the following:

9
10 Applicable codes and standards (such as ASTM or ASME) for the item(s) and/or material to
11 which the CMTR applies.

12
13 General description of the item(s) and/or material to which the CMTR applies.

14
15 Heat or lot number of the item(s) and/or material to which the CMTR applies.

16
17 Actual chemical composition and the physical characteristics of the item(s) and/or material to
18 which the CMTR applies. The physical characteristics noted shall include ultimate tensile
19 strength, yield strength and elongation as a minimum. Reporting of physical characteristics
20 is not required in the case of weld filler material unless otherwise noted in the applicable
21 specification subdivision.

22
23 Signature and organizational title of the individual authorized to certify the accuracy of the
24 data indicated on the CMTR for the item(s) and/or material shown.

25
26 EQUIPMENT DATA:

27
28 Where specifically required by other sections, equipment data shall be provided. As
29 applicable and except as otherwise specified, equipment data shall include the manufacturer's
30 name and address, the model number, and specific information on performance, operating
31 curves and data, ratings, capacities, characteristic efficiencies, catalog data, equipment
32 dimensions, evidence of compliance with safety and performance standards, and other data
33 required to fully describe the equipment. Data shall be submitted in sets covering complete
34 systems or functioning units. The data shall also be identified with the tag number of the
35 equipment or device for which the data applies.

36
37 INSPECTION AND TEST PROCEDURES:

38
39 Where specifically required by other sections, inspection and test procedures shall be
40 provided. Inspection and test procedures shall include, as applicable: description of item or
41 items involved, inspection or testing to be performed, a listing of testing agency and technical
42 personnel to be used, description of equipment and facilities to be used, test prerequisites, test
43 methods, test evaluation and acceptance criteria, safety precautions, sign-off requirements,
44 methods for control and calibration of measuring and test equipment, proposed test record

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1 form, references to applicable portions of the subcontract documents, and detailed
2 procedures, methods, and criteria for evaluation and acceptance. Test procedures shall be
3 prepared in accordance with Article SC-5 "QUALITY ASSURANCE" of the Special
4 Conditions.

5
6 INSPECTION AND TEST REPORTS:

7
8 Where specifically required by other sections, inspection and test reports shall be provided
9 within 10 working days of such inspection or test. Inspection and test reports shall include,
10 as applicable: identification of material or item inspected, inspection data, functional test
11 data, date(s) and place(s) of inspection/tests, names of agencies and technicians involved,
12 references to procedures and methods used, references to applicable portions of the
13 subcontract documents, names of persons evaluating test results, identification of work
14 failing to meet inspection/test acceptance criteria, and detailed description of corrective
15 action taken.

16
17 INSTALLATION, APPLICATION, AND ERECTION INSTRUCTIONS:

18
19 Installation, application, and erection instructions shall be provided where specifically
20 required by other sections. Installation, application, and erection instructions shall be clear,
21 concise, and detailed, and shall utilize drawings and pictures to the extent necessary. The
22 instructions shall include procedures for delivery acceptance, unpacking, inspection,
23 repacking, storage, handling, preparation of supporting work, assembly, and incorporation of
24 the material/equipment into the work. The instructions shall include sequences, precautions,
25 and tolerances.

26
27 In general, the Contractor's Representative will inspect the work to the criteria and
28 instructions prescribed in the manufacturer's installation, application and erection
29 instructions. The Subcontractor shall not deviate from the written instructions without prior
30 written approval and direction from the manufacturer; such approval and direction shall be
31 submitted to the Contractor as an attachment to the manufacturer's installation, application
32 and erection instructions.

33
34 MATERIAL AND EQUIPMENT LISTS:

35
36 Where specifically required by other subdivisions, material and equipment lists shall be
37 provided. Material and equipment lists shall be complete for the work specified under the
38 subdivision and shall include all materials, products, equipment, and fixtures, including
39 consumables. Lists shall include manufacturer's name and address, trade or brand name,
40 local supplier's name and address, unit quantities and catalog numbers required to fully
41 describe the item.

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1 OPERATION AND MAINTENANCE (O&M) MANUALS:

2
3 Where specifically required by other sections, operation and maintenance manuals shall be
4 provided.

5
6 Contents: O&M manuals for manufacturer's standard items shall, unless otherwise specified,
7 be the standard publication issued for the product by the manufacturer.

8
9 O&M manual for special engineered items or systems shall, as a minimum, contain the
10 following information when applicable, unless the information is requested and submitted
11 separately:

12
13 Cover sheet identifying the project, site, Contractor, Subcontractor and identification of the
14 specific equipment or system described therein.

15
16 Table of contents listing sections, paragraphs, subparagraphs, and the page numbers
17 where each one starts.

18
19 General introduction and overall equipment and system descriptions, including purpose,
20 function, and simplified theory of operation.

21
22 Safety considerations including load limits, voltages, capacities, speeds, temperatures,
23 and pressures.

24
25 Start-up sequence instructions, operating instructions, and instructions for both normal
26 and emergency shutdown sequences.

27
28 Recommended procedures and frequencies for preventive maintenance including
29 inspection, tests, adjustment, lubrication, and cleaning.

30
31 Required preventative maintenance and frequency to ensure warranties.

32
33 Troubleshooting, checkout, repair, and replacement procedures.

34
35 List of test point locations for troubleshooting, and normal operating test values at each
36 point provided.

37
38 List of lubricants and other consumables for each item of equipment, and approximate
39 quantities needed per year; where possible, types of consumables shall be consolidated,
40 with equipment manufacturer's approval, to minimize the number of different
41 consumables required.

42
43 List of tools and equipment required for testing and maintenance.
44

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1 Complete equipment list, supplier's equipment specifications, and equipment and
2 product data.

3
4 Complete parts lists for each item of equipment reflecting the manufacturer's name,
5 address, and telephone number; part number, nomenclature and exploded views of each
6 assembly.

7
8 Spare parts list and information described in paragraph entitled "Spare Parts Lists".
9

10 Mechanical, electrical, and instrumentation schematics and diagrams for each item of
11 equipment and the integrated systems.

12
13 Instrument/equipment calibration instructions, including calibration set points where
14 applicable.

15
16 "As-Built" drawings and shop drawings.

17
18 Warranties including the name, address, and telephone number of the firm providing
19 the warranty service.

20
21 O&M manuals shall be suitable for copying and microfilming.

22
23 **PRODUCT DATA:**

24
25 Where specifically required by other sections, product data shall be provided. Product data
26 shall include descriptive material, such as catalog data, diagrams, color charts, and other data
27 published by the manufacturer, as well as evidence of compliance with safety and
28 performance standards. To demonstrate conformance to the specified requirements; catalog
29 numbers alone will not be acceptable. The data shall include the name and address of the
30 nearest service and maintenance organization that regularly stocks repair parts.

31
32 Product data submittals shall reference the applicable subdivision and drawings, and be
33 complete for each item or unit of work.

34
35 **SAMPLES:**

36
37 Where specifically required by other sections, samples shall be provided. Samples shall be
38 identical with final condition of materials or products proposed for the work. Two full sets of
39 optional samples shall be provided when required. Information shall be provided with each
40 sample to show generic description, source or product name and manufacturer, limitations,
41 and compliance with standards. If requested by the Subcontractor, one sample set may be
42 returned to be incorporated in the work. If incorporated into the work such sample shall be
43 labeled in an approved manner and the installed location recorded on "Redline" drawings.

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1 SHOP DRAWINGS:

2
3 Where specifically required by other sections, shop drawings shall be provided. Each shop
4 drawing submittal shall be complete and shall be accompanied by technical and performance
5 data as necessary to fully illustrate the information in the shop drawings, or cross referenced
6 to such data contained in previous submittals. Unless otherwise specified, submittals shall
7 consist of black-line printed copies. Hard copies and an electronic copy shall be submitted
8 where required by other specification sections. Electronic copies of CAD generated drawings
9 shall be provided in a form which will transfer to the Contractor's software using IGES or a
10 custom software provided by the Subcontractor. Sepia type prints are not acceptable. One
11 set of copies will be returned to the Subcontractor marked to show the required corrections or
12 approval.

13
14 All equipment or other devices shall be identified on the shop drawings by the tag number
15 indicated on the design drawings. The Subcontractor shall identify all equipment and devices
16 with tags or labels in accordance with the requirements specified in the respective
17 subdivision.

18
19 The following additional submittals shall be required as indicated on the Vendor Data
20 Schedule:

21
22 Redline Drawings: Copies of the shop drawings shall be updated to include all changes
23 or modifications made during construction and to reflect the actual conditions of
24 construction. Each drawing shall be marked "As-Built" and be signed by the
25 Subcontractor representative and shall be suitable for XEROX copying or microfilming.

26
27 Title Block and Identification: On each shop drawing, a 1-1/2 x 2-1/2 in. space shall be
28 provided for the Contractor's review status stamp. Each shop drawing shall include a title
29 block showing:

30
31 Project name and location.

32
33 Name and address of Subcontractor or manufacturer as applicable.

34 Date, scale of drawings, unique drawing identification number, and referenced design
35 drawing number.

36
37 Subcontractor's review and approval stamp or signatures.

38
39 Revision record including signatures and dates.

40
41 Preparation and Size: Details and information shall be clearly drawn, dimensioned
42 (including tolerances), noted, cross referenced and shall be of such quality as to ensure
43 legible B (11 x 17 in.) size photocopy reproductions from microfilm (by others). Drafting

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1 and drawing standards shall be consistent with the practices established by ANSI or other
2 acceptable standards and as specified herein:

3
4 Where applicable, views shall be oriented so that plant north faces to the left or up.

5
6 Use of abbreviations shall be avoided where space permits spelling in full; if used,
7 abbreviations shall be described in a legend on the drawing.

8
9 Types: Shop drawing shall be of the specific types specified in the respective subdivisions.
10 If a specific type is not specified, drawing shall be the type most commonly required for the
11 specific class of work subject to the Contractor's approval. The most commonly required
12 types of shop drawings and drawing content (as applicable) are described hereinafter.

13
14 Connection Diagrams: Shall indicate the relationships and connections of devices and
15 apparatus. They shall show the general physical layout of all controls, the interconnection of
16 one system, or portion of system, with another, and all internal tubing, wiring, and other
17 devices. For simple installations, connection diagrams and interconnection diagrams may be
18 combined onto a common drawing.

19
20 Control Diagrams: Shall show the physical and functional relationship of equipment.
21 Electrical diagrams shall show size, type, of the systems. Pneumatic diagrams shall be
22 furnished where gas systems are used. For simple installations, control wiring diagrams may
23 be combined onto a common drawing.

24
25 Drawings: Shall be composite drawings showing the work of one trade with that of other
26 trades in the same contract and the structural and architectural elements of the work.
27 Composite drawings shall be in sufficient detail to show overall dimensions of related items,
28 clearances, and relative locations of work in allotted spaces.

29
30 Detail Drawings: Shall consist of dimensioned fabrication and assembly drawings for all
31 parts of the work in such detail to enable the Contractor to check conformity with the
32 contractual requirements.

33
34 Elementary Diagrams: Shall indicate, in straight-line form, without regard for physical
35 relationship, all supporting systems and elements of equipment and associated apparatus.

36
37 Layout Drawings: Shall be consolidated for all trades in the subcontract, and show to scale
38 pertinent structural and fenestration features and other items, such as cabinets, required for
39 installation and which could affect the available space. Mechanical and electrical equipment
40 and accessories shall be shown to scale in plan, elevation and/or section, in their installed
41 positions. Duct work, plumbing, and piping shall also be indicated. Submittals describing
42 the various mechanical and electrical equipment items, which are to be installed in areas
43 represented by layout drawings, shall be assembled and submitted concurrently with and
44 accompanied by the room layout drawings.

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1 Fabrication, Erection, and Installation Drawings: Shall indicate equipment arrangement and
2 shall include dimensions, elevations, sections, and enlarged details showing proper methods
3 of field fabrication, construction, and installation.
4

5 Interconnection Diagrams: Shall be to scale and indicate interface between associated units
6 of equipment and between equipment and systems. Internal equipment connections shall be
7 shown on the connection diagrams. For simple installations, connection and interconnection
8 diagrams may be combined onto a common drawing.
9

10 Outline Drawings: Shall indicate overall physical features, dimensions, ratings, center of
11 gravity, lifting points, service requirements, and weight of equipment.
12

13 Schematic Drawings: Shall show the functional flow of systems and their interfaces with
14 facilities and other systems. Functional and physical interfaces shall be indicated.
15 Schematics need not be to scale. Schematic may be structural, mechanical, electrical,
16 instrumentation or any combination of these with respect to the equipment or systems to be
17 installed.
18

19 Single-line Diagrams: Shall indicate, by means of single lines and simplified symbols, the
20 paths and component parts of systems. Items shall be clearly labeled to indicate ratings and
21 use in the system.
22

23 Wiring Diagrams: Shall identify all terminals, terminal blocks, and wires with wire numbers
24 and colors. All wires within enclosures and all wiring connections to externally located
25 equipment and devices shall be shown. For simple installations, wiring diagrams and control
26 diagrams may be combined onto a common drawing.
27

28 Isometric Drawings: For piping systems, indicate three-dimensional piping layouts in the
29 isometric format. Piping shall be represented as a single-line and in-line components shall be
30 represented with standard drafting symbols.
31

32 SPARE PARTS LISTS: 33

34 Where specifically required by other sections, spare parts lists shall be provided. Spare parts
35 lists shall include all spare parts and the current list price of each spare part. The spare parts
36 lists shall also identify those spare parts, which each manufacturer recommends for
37 maintenance at the site. Each manufacturer or vendor shall indicate the name, address, and
38 telephone number of its spare parts source closest to the INEEL.
39

40 The Subcontractor shall cross-reference all spare parts lists to the equipment tag numbers
41 designated in the specifications or on the drawings. If O&M manuals are specified for
42 equipment, spare parts lists shall be submitted as part of the O&M manual.
43
44

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CALCULATIONS:

Where specifically required by other sections, calculations shall be provided. Engineering calculations and analyses shall be fully checked by a qualified individual other than the originator, and shall be signed and dated as checked. All final submittals of calculations shall be bound and shall include the title and purpose of the calculation, a table of contents or index, complete list of references, design basis and complete list of assumption (if any), methodology, and sufficient information to allow independent verification of the calculation.

Calculations which are performed by computer or with computer assistance shall include a description of the hardware and software used, a description of the model employed if applicable, verification documentation for the computer program, and a copy of the computer input and output. All revisions to submitted calculations, as a result of comments by the Contractor or design changes by the Subcontractor, however minor, shall be resubmitted.

SPECIAL PACKAGING, HANDLING, OR STORAGE PROCEDURES:

Where specifically required by other sections, special packaging, handling, rigging, shipping, storage, or preservation procedures shall be provided. These procedures shall contain the following minimum requirements as applicable:

Measures taken to prevent damage during transit.

Detailed description of container design.

Overall dimensions and approximate weight of container and contents.

Recommended method for off-loading.

List of required special off-loading devices.

Special instruction for proper packaging and preventative maintenance during storage at the site.

Special instructions for marking.

Safety code labels, if applicable.

INTEGRATED MANUFACTURING, INSPECTION, AND TEST PLAN:

Where specifically required by other sections, an integrated manufacturing, inspection, and test plan shall be provided. The integrated plan shall itemize the manufacturing, inspection, and/or test procedure steps associated with initial material preparation through end product

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1 delivery. The plan shall incorporate "source inspection hold points" as specified in the
2 individual section.

3

4 PART 3--EXECUTION (NOT APPLICABLE)

5

6 END OF SECTION